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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,606	04/08/2004	Sang H. Dhong	END920030125US1 (17131)	1561
23389 7590 08/03/2007 SCULLY SCOTT MURPHY & PRESSER, PC 400 GARDEN CITY PLAZA SUITE 300 GARDEN CITY, NY 11530			EXAMINER DO, CHAT C	
			ART UNIT 2193	PAPER NUMBER
			MAIL DATE 08/03/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/821,606	<b>Applicant(s)</b> DHONG ET AL.	
	<b>Examiner</b> Chat C. Do	<b>Art Unit</b> 2193	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 April 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>04/08/2004</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Drawings*

1. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated which is disclosed as conventional FPU in paragraph [0020] in the original specification. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the limitations cited claims 3 and 9 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the

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renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 1, the limitation "a aligner coupled to the multiplier...of the operands" in line 5 is missed-descriptive since the aligner is used for only shifting the input to appropriate amount for aligning. The aligner does not combine the product and the third of the operands as cited in the claim. For examination purposes, the examiner considers the aligner as the shifter as seen in Figure 1 wherein the adder is component used for combining the product and shifted third operands. Claim 13 has the similar rejection.

Re claim 3, the limitation "aligner includes means to compute...the third operand" is missed-descriptive since the aligner is used for only shifting the operand, but it does not shift the product as cited in the claim as seen in Figures 1-3. For examination

purposes, the examiner considers the aligner is used for only shifting the input operand.

Claim 15 has the similar rejection.

Re claim 12, the limitation "ea+eb-2eb" in line 3 lack of antecedence basis. For examination purposes, the examiner considers ea as first exponent, eb as second exponent, and 2eb as twice as much as second exponent which the alignment shift amount is set to ea-eb.

Thus, claims 2, 4-11, 14, and 16-20 are also rejected for being dependent on the rejection of rejected base claims 1 and 13.

***Claim Rejections - 35 USC § 101***

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 1-20 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-20 cite a method and unit for performing multiplying/adding operation in accordance with a mathematical algorithm. In order for claims to be statutory, claims must either include a practical/physical application or a concrete, useful, and tangible result. However, claims 1-20 merely disclose steps/components for performing multiplying/adding operation without further disclosing a practical/physical application or a useful and tangible result since the claims appear to preempt every substantial practical application of the idea embodied by the claim and there is no cited limitation in the claims that breathes sufficient life and meaning into the preamble so as to limit it to a

particular practical application rather than being so broad and sweeping as to cover every substantial practical application of the idea embodied therein. Therefore, claims 1-20 are directed to non-statutory subject matter.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-5 and 11-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Elliott et al. (U.S. 5,880,983).

Re claim 1, Elliott et al. disclose in Figures 2 a floating point execution unit (e.g. Figure 2) for performing multiply/add operations (e.g. abstract and col. 3 lines 39-46) using a plurality of operands taken from an instruction having a plurality of operand positions (e.g. corresponding to A, B, and C operands as mentioned in col. 1 lines 21-50), the floating point unit (e.g. Figure 2) comprising: a multiplier (e.g. component 102 in Figure 2B) for calculating a product of two of the operands (e.g. as output of multiplier 102 with A and C as input operands in Figure 2B); an aligner (e.g. components first and second aligners 118 in Figures 2A and 2B) coupled to the multiplier for combining said product and a third of the operands (e.g. third operand is B as seen in Figure 2A); a first data path for supplying to the multiplier operands from a first and a second of the operand positions of the instruction (e.g. first data path for feeding A and C operands into

multiplier 102 in Figure 2B); a second data path for supplying the third operand to the aligner (e.g. data path for feeding B into muxes 114 and 116 in Figure 2A); and a multiplexer (e.g. muxes 114 and 116 in Figure 2A) on the second data path for selecting, for use by the aligner, either the operand from the second operand position of the instruction (e.g. operand A) or the operand from the third operand position of the instruction (e.g. operand B as seen in Figure 2A).

Re claim 2, Elliott et al. further disclose in Figures 2 the first data path is maintained free of multiplexer operations (e.g. Figure 2B wherein the operands A and C operands are fed directly into the multiplier 102).

Re claim 3, Elliott et al. further disclose in Figures 2 aligner includes means to compute a shift amount for aligning said product and the third operand (e.g. components 111 and 118 in Figure 2A); and the multiplexer operates to select the third operand in parallel with the means to compute the shift amount (e.g. components 114 or 116 in Figure 2A).

Re claim 4, Elliott et al. further disclose in Figures 2 multiplexer selects the third operand while the means to compute computes said shift amount (e.g. Figure 2A).

Re claim 5, Elliott et al. further disclose in Figures 2 each of the operands and said product includes an exponent value (e.g. as part of floating point number system as seen in col. 1 lines 21-57), and the means to compute computes said shift amount based only on said exponent values (e.g. inherently as for adding correctly as seen in Figure 2A).

Re claim 11, Elliott et al. further disclose in Figures 2 the means to compute the shift amount compresses two of the three input exponents and an offset while selecting the third exponent (e.g. two of three inputs exponents are belong to addends as seen in Figure 2A).

Re claim 12, Elliott et al. further disclose in Figures 2 when executing an add or subtract instruction, the means to compute the shift amount computes the alignment shift amount as  $ea+eb-2eb$  (e.g. Figure 2A as difference between the adding operand in order to align properly).

Re claim 13, it is a method claim having similar limitations cited in claim 1. Thus, claim 13 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 14, it is a method claim having similar limitations cited in claim 2. Thus, claim 14 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 15, it is a method claim having similar limitations cited in claim 3. Thus, claim 15 is also rejected under the same rationale as cited in the rejection of rejected claim 3.

Re claim 16, it is a method claim having similar limitations cited in claim 4. Thus, claim 16 is also rejected under the same rationale as cited in the rejection of rejected claim 4.



Re claim 17, it is a method claim having similar limitations cited in claim 5. Thus, claim 17 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 6-8 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elliott et al. (U.S. 5,880,983) in view of Willson Jr. et al. (U.S. 7,228,325).

Re claims 6-8, Elliott et al. further disclose in Figures 2 each of the operands has an exponent value, and further comprising means, operating in parallel with the multiplier and the aligner, to determine whether the exponent values of any of the operands is zero while the multiplier calculates said product to establishes a test result number. However, Willson Jr. et al. disclose each of the operands has an exponent value, and further comprising means, operating in parallel with the multiplier and the aligner, to determine whether the exponent values of any of the operands is zero (e.g. col. 7 line 60 to col. 8 line 15) while the multiplier calculates said product to establishes a test result number (e.g. as for bypass the adder and claims 30-31). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add each of the operands has an exponent value, and further comprising means, operating in parallel

with the multiplier and the aligner, to determine whether the exponent values of any of the operands is zero while the multiplier calculates said product to establishes a test result number as generally seen in concept in willson Jr. et al.'s invention into Elliott et al.'s invention because it would lower power consumption (e.g. col. 7 lines 50-65 due to bypassing the adder/multiplication computation).

Re claim 18, it is a method claim having similar limitations cited in claim 6. Thus, claim 18 is also rejected under the same rationale as cited in the rejection of rejected claim 6.

Re claim 19, it is a method claim having similar limitations cited in claim 7. Thus, claim 19 is also rejected under the same rationale as cited in the rejection of rejected claim 7.

### *Conclusion*

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. U.S. Patent No. 5,880,984 to Burchfiel et al. disclose a method and apparatus for performing high-precision multiply-add calculations using independent multiply and add instruments.
- b. U.S. Patent No. 5,375,078 to Hrusecky et al. disclose an arithmetic unit for performing  $XY+B$  operation.
- c. U.S. Patent No. 4,999,802 to Cocanougher et al. disclose a floating point arithmetic two cycle data flow.

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- d. U.S. Patent No. 5,341,321 to Karp et al. disclose a floating point arithmetic unit using modified Newton-Raphson technique for division and square root.
- e. U.S. Patent No. 7,058,830 to Dhong et al. disclose a power saving in a floating point unit using a multiplier and aligner bypass.
- f. U.S. Patent No. 6,697,833 to Krygowski et al. disclose a floating-point multiplier for de-normalized inputs.
- g. U.S. Patent No. 6,275,838 to Blomgren et al. disclose a method and apparatus for an enhanced floating point unit with graphics and integer capabilities.
- h. U.S. Patent Publication Application No. 2002/0124037 to Krygowski et al. disclose a floating-point multiplier for de-normalized inputs.
- i. U.S. Patent Publication Application No. 2004/0122886 to Gerwig et al. disclose a high-sticky calculation in pipelined fused multiply/add circuitry.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (571) 272-3721. The examiner can normally be reached on M => F from 7:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do  
Examiner  
Art Unit 2193

July 26, 2007

A handwritten signature in black ink, appearing to be 'Chat C. Do', written in a cursive style.